We frequently hear this "Story"...

"*I am a mid-career investigator and I just cannot renew my R01. I am still very excited about my research but I will have to shut down my lab and may have to change careers after investing so much in training and building my research capabilities...*"

Enabling a Viable Pipeline of NHLBI Extramural Investigators in Fiscally Challenging Times

Marc Charette, Young Oh, Christine Maric-Bilkan, Paula Schum, Yunling Gao, Cheryl McDonald, Diane Reid, Valerie Robinson, Dennis Stanley, Kelin Fuentes, Michelle Olive, Eser Tolunay, Zorina Galis, Matthew Eblen, and Katrina Pearson

NIH National Institutes of Health

Office of Policy, Analysis, and Communication

NIH National Heart, Lung, and Blood Institute

Division of Cardiovascular Sciences

Questions

Are mid-career investigators experiencing "disproportionate" difficulties in the advancement of their professional careers?

Is there an "imbalance" within the pipeline of investigators that may pose a future problem for NHLBI and DCVS?

There is an Evolving Imbalance among RPG Awardees within NIH, NHLBI, and DCVS

Proportion of RPG Awardees by Age Group
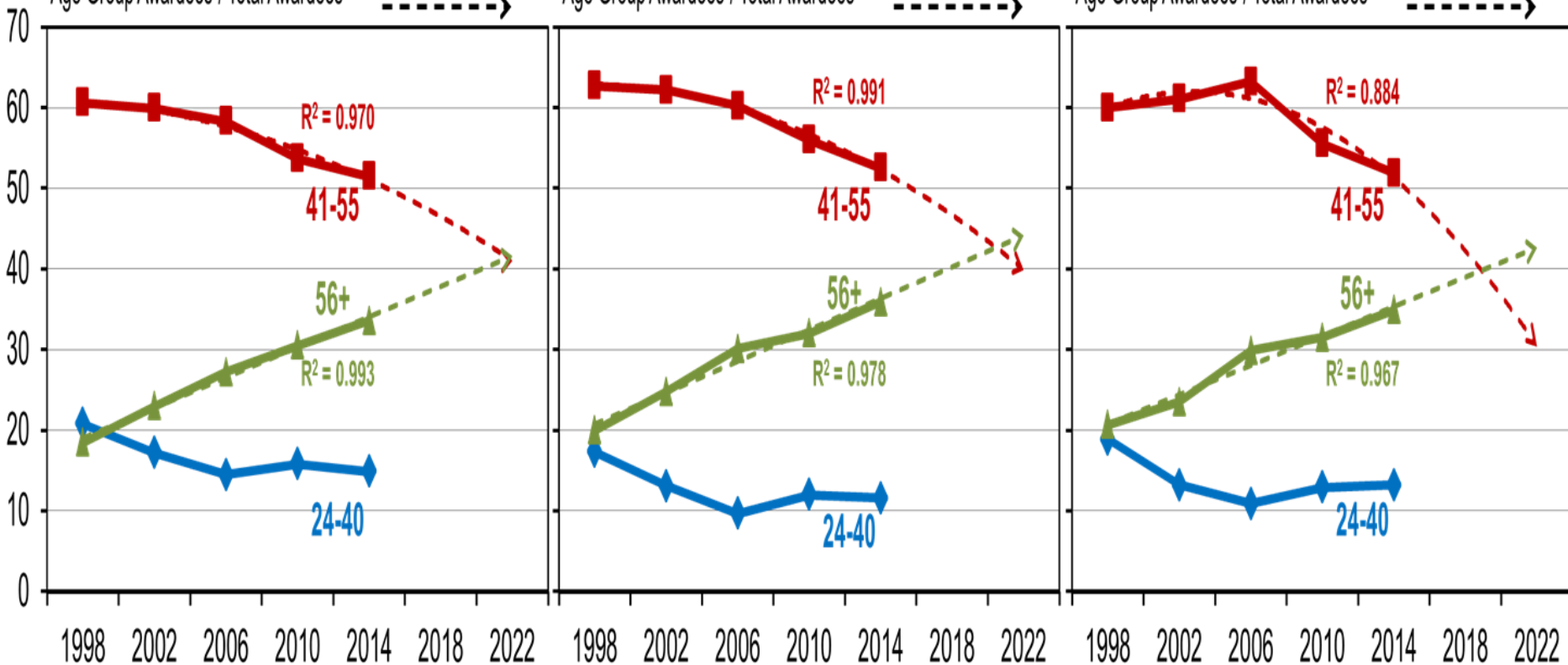

NIH
Age Group Awardees / Total Awardees — FORECAST

$R^2 = 0.970$ (41-55)
$R^2 = 0.993$ (56+)
24-40

NHLBI
Age Group Awardees / Total Awardees — FORECAST

$R^2 = 0.991$ (41-55)
$R^2 = 0.978$ (56+)
24-40

DCVS
Age Group Awardees / Total Awardees — FORECAST

$R^2 = 0.884$ (41-55)
$R^2 = 0.967$ (56+)
24-40

Possible Sources of the Imbalance

1. Established investigator bias resulting in differential award rates? *No*

2. Reduced pay lines resulting in differential award rates? *No*

3. Multiple grant applications resulting in disproportionate number of awards? *No*
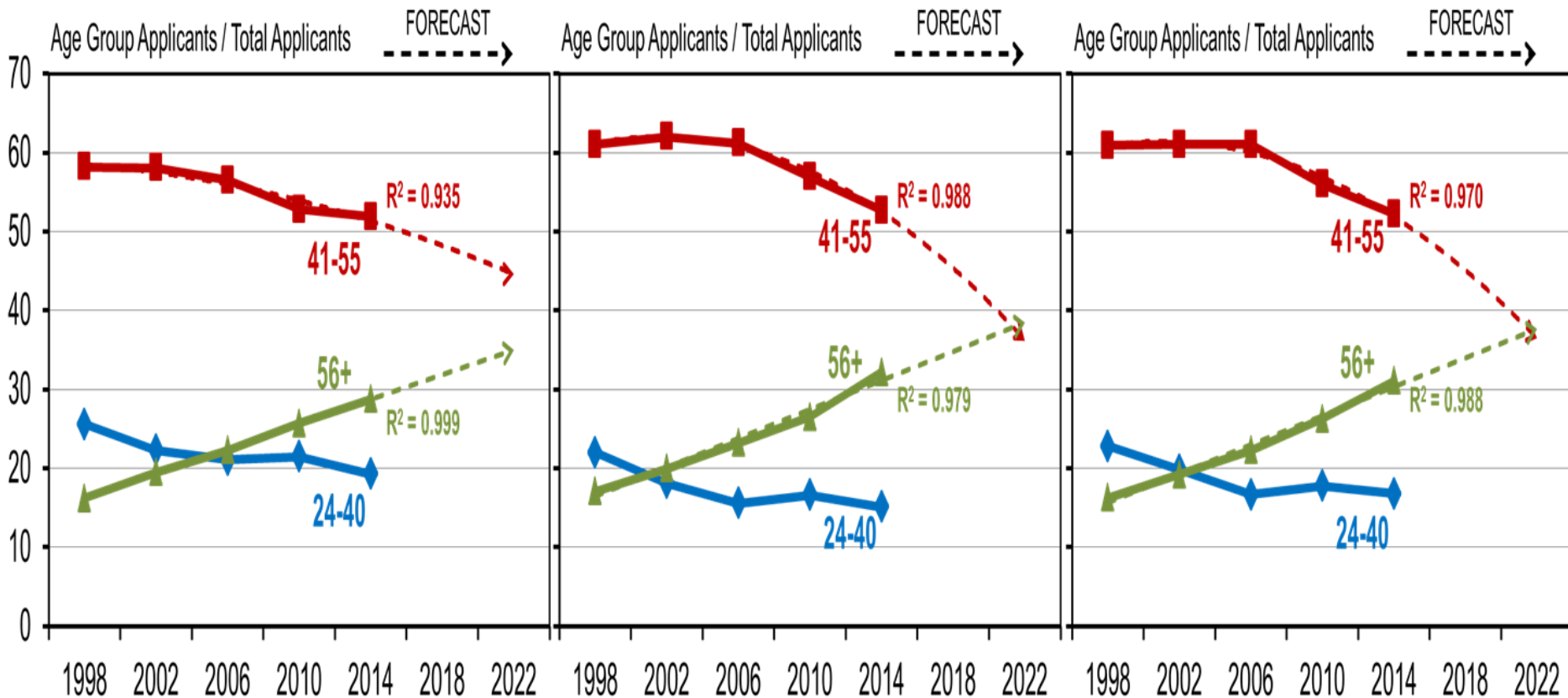
4. Demographic shift among RPG applicants? *Yes*

The Imbalance is Caused by Shifting Demographics among RPG Applicants

Proportion of Competing RPG Applicants by Age Group

The Effect of the Imbalance is Enhanced by Disproportionate Allocation of Direct Dollars

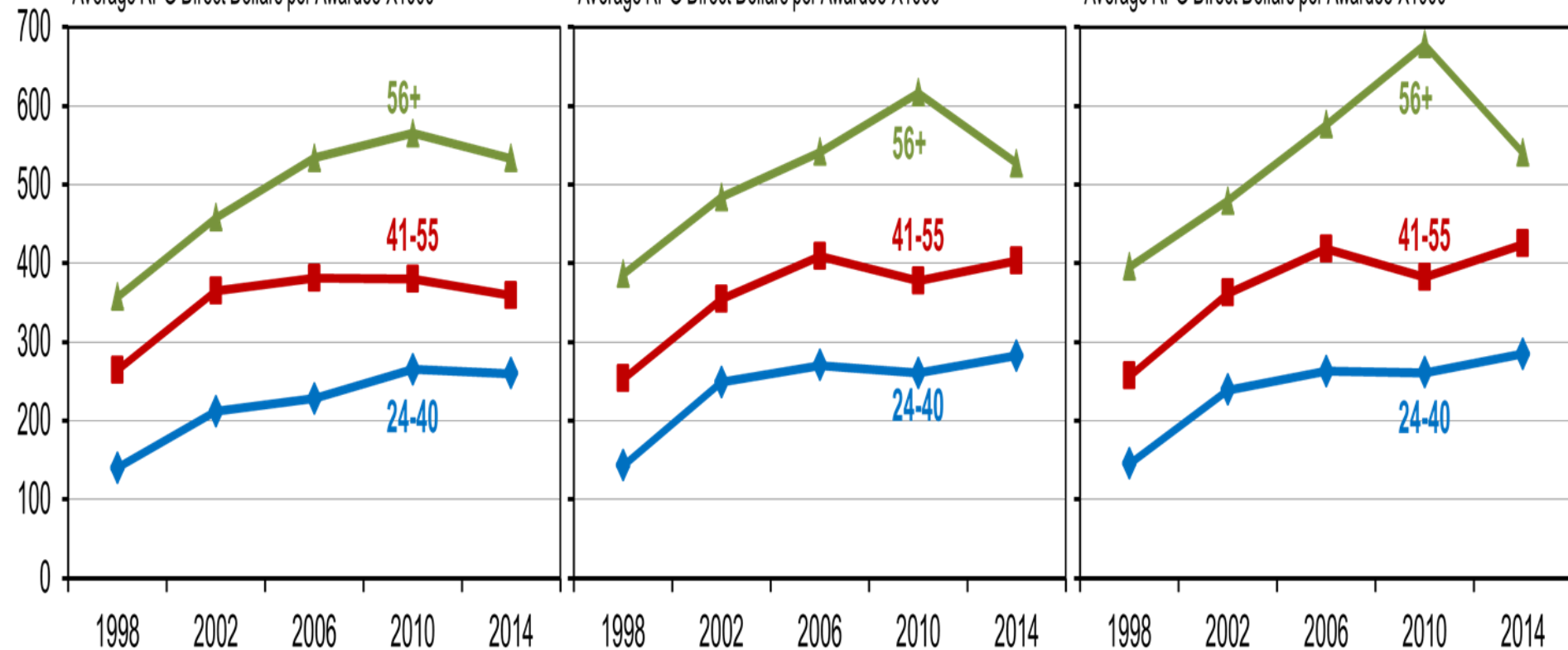## Average RPG Direct <u>Dollars per Awardee</u> by Age Group

NIH

NHLBI

DCVS

Project Parameters

- Data Source: The Office of Policy, Analysis, and Communication, OER

- Grant Types: All Research Project Grants

- Time Frame: 1998-2014

- Age Groupings:

     Blue = 24-40 years = "early stage" investigator

     Red = 41-55 years = "mid-career" investigator

   **Green = 56-70+ years = "established" investigator**

Imbalance Cause and Effect

- The imbalance appears to be caused primarily by demographic increases in the proportion of established investigators relative to mid-career or early-stage investigators among RPG applicants.

- Because established investigators receive, on average, substantially more RPG dollars than other age groups, the funds remaining for other investigators are reduced disproportionately.

- This imbalance effect is especially pronounced during times of level funding and may lead to substantial reductions in the number of mid-career investigators.
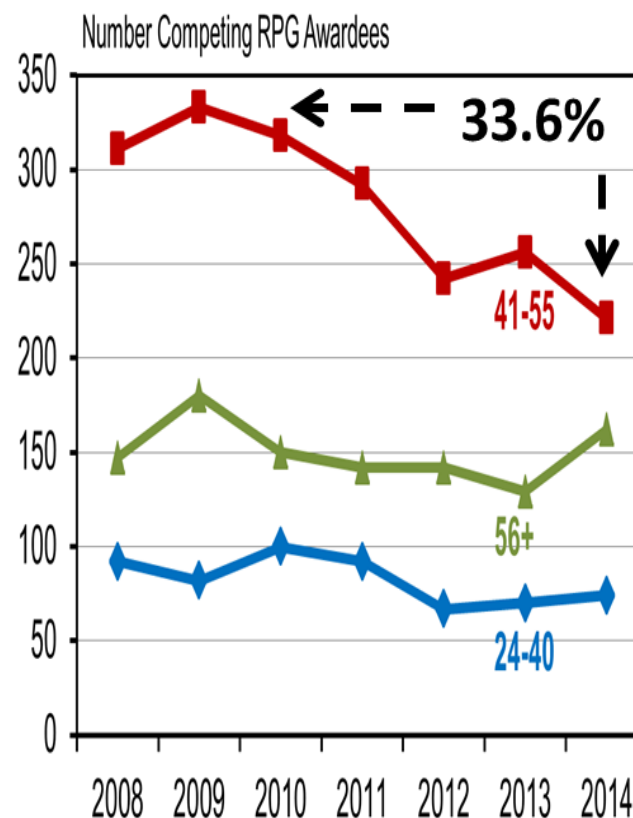
The Number of Mid-Career Awardees at NHLBI and DCVS is Declining Disproportionately

Number of Competing RPG Awardees by Age Group
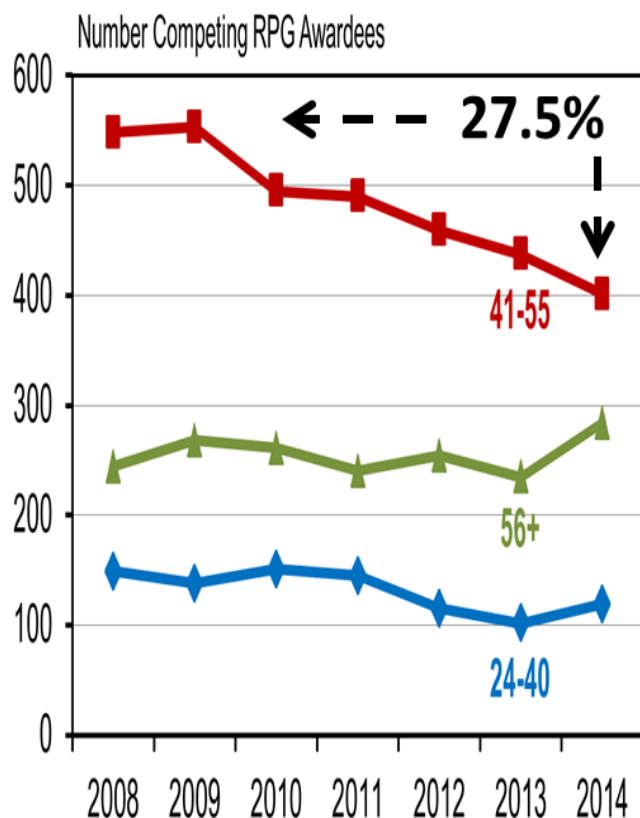
Potential Means of Turning the "Decline of Mid-Career Awardees" Curve

Near-term: **Enhance Survival of Mid-Career PIs**

1) Use select pay to target those qualified investigators with least amount of funding

2) Target R35 Program towards those qualified investigators with only one R01 award

Long-term: **Increase Number of Early-Stage PIs**

1) Change the P01 mechanism to promote more inclusion of junior investigators

2) Increase the ESI percentile advantage and/or develop new mechanisms to boost ESIs

Concluding Thoughts

- There is a significant and evolving imbalance affecting the distribution of RPG investigators at NIH, NHLBI, and DCVS.

- If left unchecked the imbalance may result in a substantial reduction in the number of mid-career investigators.

- The net result could be a "gap" in the pipeline of investigators and a corresponding reduction in the diversity of the scientific workforce.

VBHB

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